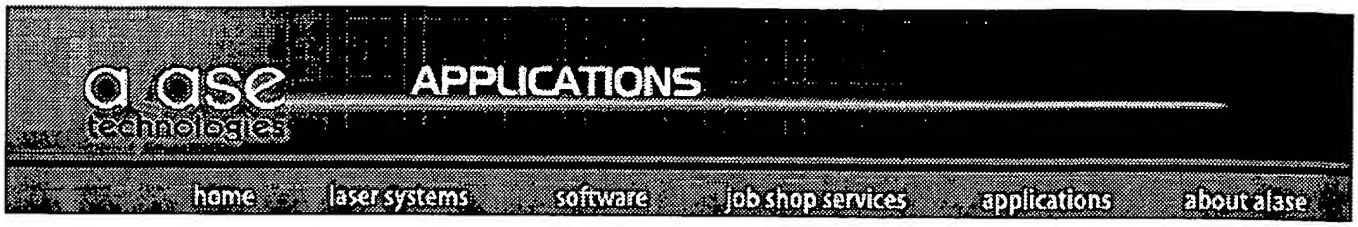

Applications
General Overview
Laser Marking
Coding and Identification
Fixed vs. VariField
Micro-Hole Drilling

The Unique Features of Laser Marking

Indelibility
Laser marks are permanently engraved or cause a permanent chemical change in the surface of the base material. They can only be removed by destroying the base material.

Speed
Alase's systems can move a tightly focused spot of laser energy around a target at more than six meters (20 feet) per second. Materials such as electronic encapsulating epoxies, aluminum anodize, powder coatings, paints, polymer films, wood, paper, etc. react readily with the laser beam and can be marked at very high speeds. Materials such as steels which require more power to be successfully engraved are marked more slowly, so that the energy of the laser beam has time to linger on each spot and cut more deeply into or do more chemical change to the surface of the part.

Data Flexibility
Alase systems write computer-generated numbers, text and images directly onto products at a high level of resolution. Numbers and text are especially flexible because they can be entered right from the keyboard, similar to a word processing program. Code numbers can be entered once, and then sequentially serialized, they can be marked as their equivalent barcodes, and batchcodes can be incremented as each predetermine number of units in the batch has been marked.

LASER markin ideal for:

Die Cutting
- Prototype and Short Runs
- Volume Production

Decoration
- Personalize w Text
- Etch, Engrave Carve Artwork - even 3D

Patterning
- Selectively Etc Remove a Coat
- Selectively Cu or Process a Coating

Uniformity
Laser marking produces a uniform, professional appearance, both within the ma from mark to mark. There are no dies to wear, stencils to degrade, chemicals to their strength or inks to be mixed with more or less of a thinning solvent. The firs is the same as the millionith mark.

Process Integration
Laser marking systems slip easily into most manufacturing and assembly lines, w manual, automated-intermittant or automated-continuous. All Alase systems ada readily to automated material handling, and all can "mark-on-the-fly,"(MOTF) i.e discrete objects/cable/web segments while they are moving continuously under laser head at speeds of up to 150 meters (500 feet) per minute. Alase's unique M system actually responds to changes in line speed in real time and speeds up or down to synchronously track the moving part.

Real-Time Decisionmaking - Barcode "Travelers"
Because Alase systems mark stored or generated computer programs the mark each part can be made to respond to some real-time event. For instance, the m each electronic part— an "A" for a class I part or a "B" for a class part II, etc. —is sometimes determined by evaluating the part immediately before the marking cy then marking the appropriate letter on the part as it comes out of the evaluation

Or a barcode reader can acquire information about each part in sequence, trans information to the laser marker, and have that information or some response to t information marked onto the part. Alase systems can mark information in seque from previously compiled lists, such as lists of names, vehicle identification numb etc.

One-step Process

Laser marking requires no secondary source of materials such as inks or chemi There is no need to preprint information in advance, juggle inventories of rolls of maintain inks at proper solvent dilutions, pre-treat part surfaces to a narrow wind temperature or cleanliness, or constantly replace expensive pads, dies or stencil Laser presents a clean, completely self-contained process which adapts to a co changing flow of products, part numbers, serial numbers, etc.

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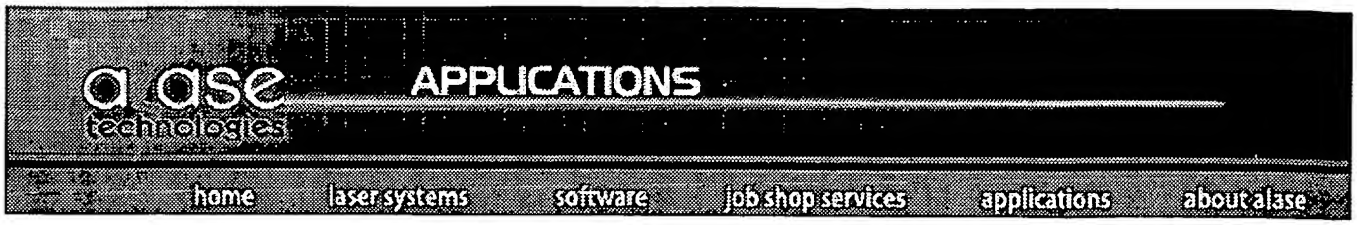

Coding and Identification

If the mark size and required resolution is known...

Large marks over broad areas
There are two types of high-speed industrial marking laser systems: static-lens-focused, which are typically limited to 300mm (12") marking fields and dynamic-focused, which have marking fields typically adjustable from 600mm (25") to 750mm (30") (see Fixed Field vs.VariField). Marking over a large area generally requires a dynamic focus system. A possible concern is that the diameter of the focused laser spot increases as the maximum field size increases. The larger the focused spot, the lower its energy density and its ability to engrave into the part. Thus large-area dynamic focus systems should usually be coupled to high-power lasers. ALASE offers both high-powered Q-switched YAG (100 watt & 150 watt) and high-powered sealed-beam CO_2 (400 watt, 250 watt and 150 watt) lasers in VariField dynamic-focus systems.

Intermediate-sized marks: 10mm - 200mm (0.4" - 8")
Static-focus (Fixed field) systems are less expensive than comparable VariField systems. They are an excellent choice for intermediate sized marks in a wide variety of materials.Choose a 4" or 8" Fixed-field system fo materials best marked by YAG (see YAG Laser Marking Systems). Or choose from 2.5" to 5.5" Fixed-field systems in CO_2 (see CO_2 Laser Marking Systems).

Fine marks (typically on small component parts) 0.010" - 0.4"
ALASE was the first laser marking company to introduce a Diode-Pumped YAG system [DPY] (see DPY Systems for a discussion of the cutting edge in all-solid-state laser marking). The DPY offers an exciting improvement in laser marking resolution with an amazing 40µ diameter focused spot. With a spot this fine characters as small as 0.25mm (0.010") can be marked clearly—although it takes magnification to read them! This is just in time fo the newest generation of miniature SMT electronic components, where frequently the entire part is no more than 4mm (0.160") square.Electronic components aren't the only products which can benefit from this sophisticated and versatile new technology. The ALS DPY increases the resolution capability of YAG marking on all parts. Medical implants, miniature optics, micro-valves, tooling inserts and a host of other small industrial components can now be laser marked with a higher degree of clarity than ever before. Logos in the range of 5mm - 10mm (0.200" 0.400 in size which previously could only be marked as muddy outlines can now be clearly readable and visually outstanding. After all, why bother to make an illegible brand on a product in the first place? Even diamonds can be marked.

Throughput required and Economic Justification

<1,000 parts per month
Some companies faced with small production volumes may choose to

acquire industrial laser marking capital equipment in order to comply with government regulations (FDA, NASA) for traceability, or to maximize their internal control over their production process. Many companies with volumes of fewer than 1,000 parts per month however, send their production out for laser engraving by a subcontract specialist. ALASE offer a full range of its own systems available for subcontract work on almost an type of part to transition the manufacturer from proof-of-principle, pilot production or low volume production to a volume great enough to justify bringing the function in-house. Consult our Job Shop Services page for details on submitting samples for bid.

1,000 - 50,000 parts per month 50,000 - 500,000 parts per month
The volume of production where laser marking justifies the purchase of capital machinery is different for every company. However, somewhere in this range the logistics of sending parts out of the plant for separate secondary operations begins to outweigh the cost of procuring the company's own laser system.For products best marked by CO_2 the choice is simply which system will do the best job technically. For YAG marking with the introduction of the DPY there is now a choice between lamp-base systems for intermediate production volumes and the new DPY for the highest required throughputs of half-a-million or more parts per year. As reliable and industrially hardened as today's YAG lasers are, lamp system still require periodic maintenance and downtime, and their cost-per-mark i driven by the cost of flashlamps and running a 4KW - 8KW power supply (plus an external water chiller). They have large footprints, require three phase wiring to install and are generally more cumbersome than their rapidly growing all-solid-state cousins.The DPY sets a new standard in YA maintenance-free performance, comparable to that of modern sealed-beam CO_2 systems. Once setup, the DPY requires NO regular maintenance, NO water cooling, and consumes only a tiny fraction of the power required by lamp-based YAGs. At this time the DPY systems that ar available are still lower in power than flashlamp YAGs, so some marking jobs may still require the greater power output of lamp systems. However for those job which can be done by DPY, it offers a significantly lower lifetime cost of ownership and the first true YAG laser marking system which can be regarded as MRO hands-off.

Variety of work to be performed

This machine needs to be justified marking only one limited class of parts
For a dedicated system the cost of VariFields extra flexibility may not be worthwhile. In some cases VariFields oversize marking field capability or it ultra-fine spot quality dictates its use. In most situations however Fixed Fiel systems will perform just about as well and at lower initial capital cost. Kee in mind though that DPY systems are also oriented toward high production volumes of 1,000,000 or more per year, particularly of small parts such as SMT electronics, fuel injectors, etc. These types of production lines typical involve little if any variety.

This machine will see a broad spectrum of part sizes
One of laser's great benefits is its flexibility in delivering custom-tailored marking to a wide assortment of parts. Flashlamp on the YAG side and most of the CO_2 systems are highly versatile. The greater the breadth of variety the more likely that the best choice is VariField.

This machine will be installed in a job shop
Subcontractors see the greatest possible variety, and business success is dependent on having the widest possible capability. The case for VariField

is clear and compelling.

This machine is for OEM installation into a larger workcell or process system

Alase Technologies works with OEMs to provide custom engineered solutions. Galvo-driven laser engines work well in a wide variety of industri processes, leaving the OEM free to add as much value as his market warrants. Consult the factory for details on how to partner with ALASE in high-speed industrial laser systems.

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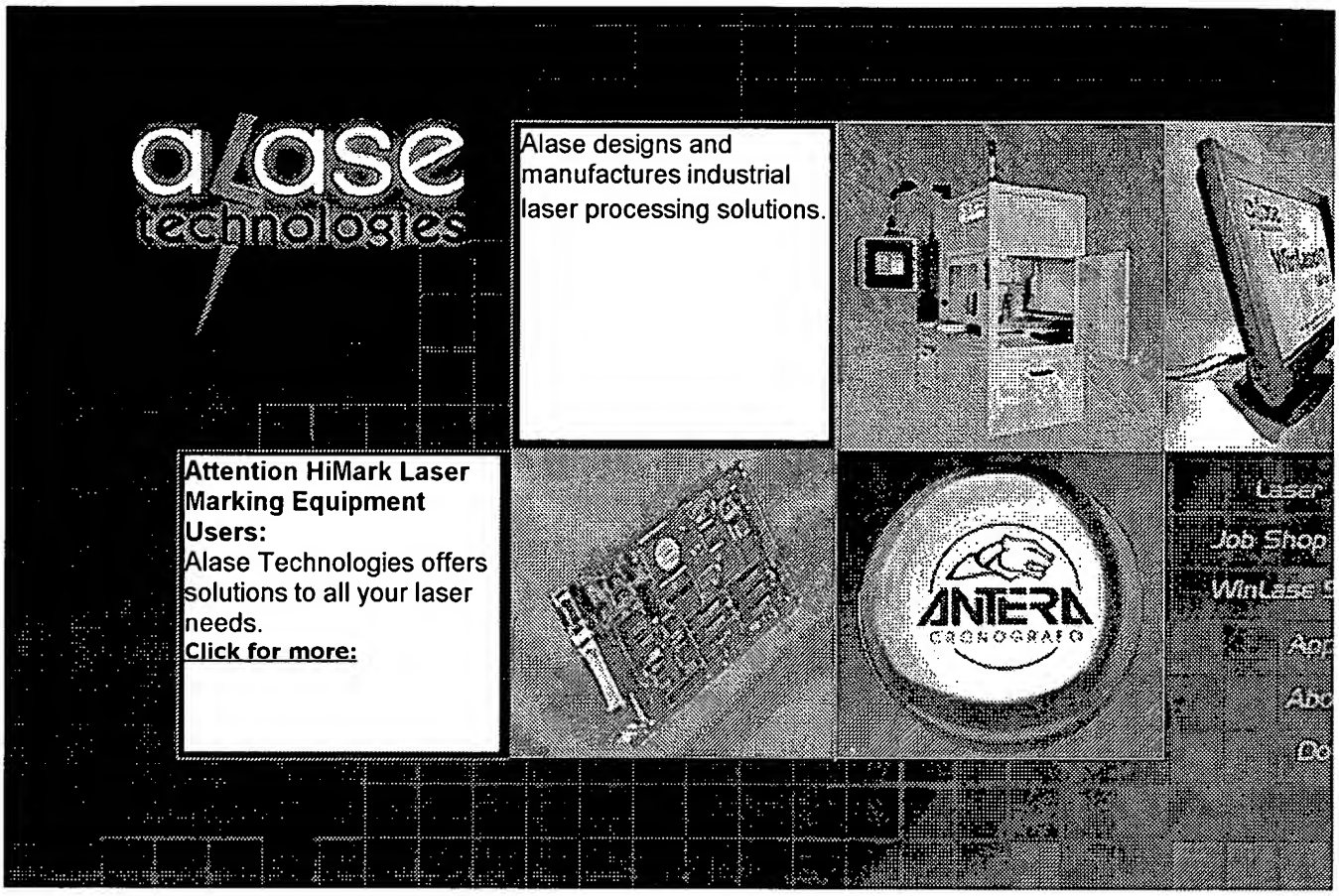
Laser Marking - Laser Engraving - Laser Systems - Laser Software



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PRODUCT REG
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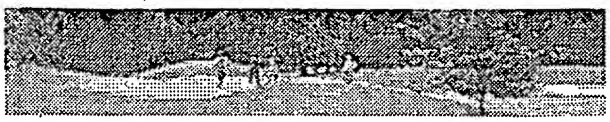


REID LOCKHART®

CLUBMAKERS

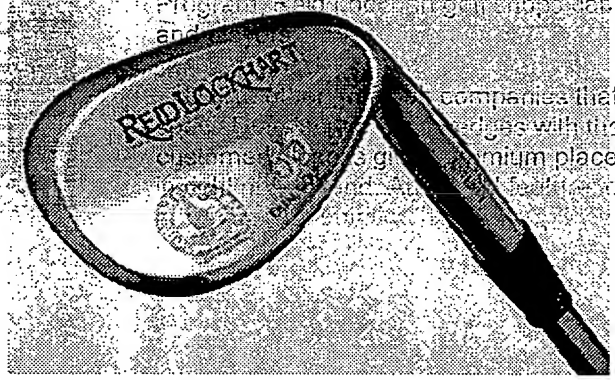
OUR PRODUCTS

DBS WEDGES	LASER ENGRAVING
R.L. BLADES	QUALITY & CUSTOM WORK
FP 50 SHAFT	ACCESSORIES

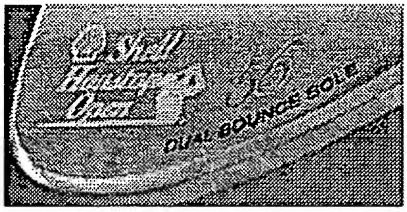
YOUR NAME AND OURS, A WINNING COMBINATION.

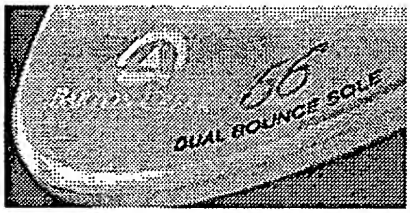
Reid Lockhart wedges can be customized with your company or tournament artwork laser-engraved. These heads are identical to our standard Dual Bounce Sole wedges, except the graphics have been rearranged to give the lasered logo top billing.

If your business gives away logo'd golf balls, imagine the impact and long-lasting impression of a Reid Lockhart wedge with your logo laser-engraved. While golf balls will be lost or beat up, your customer will be reminded of you many times in every round of golf.



For customer appreciation gifts or staff incentives, tournament prizes or player gifts, Dual Bounce Sole wedges are perfect. With a minimum order size of only 12 wedges, it's a great way for you to promote your business. Contact Corporate Sales at Reid Lockhart for more information - 800-221-2148.





BACK TO TOP

HOME
ABOUT US
OUR PRODUCTS
WHERE TO BUY/DEMO
TECH Q & A
NEWS RELEASES
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FOR IMMEDIATE RELEASE
Contact: Terry Koehler, 800-221-2148, terryk@raycookgolf.com

REID LOCKHART OFFERS LASER-ENGRAVING ON 2001 DUAL BOUNCE SOLE WEDGES

Program offers pro shops unique corporate sales opportunities.

AUSTIN, TX (February 15, 2001) - The 2001 line of Reid Lockhart Dual Bounce Sole wedges™ can now be laser-engraved with club or corporate logos, company president Terry Koehler has announced. Through the company's Corporate Sales Program, Reid Lockhart golf shops can stimulate "out-of-shop" sales from members and players.

Unlike other golf club companies that offer engraving, Reid Lockhart has created special versions of their wedges with the Reid Lockhart graphics re-arranged so the customer's logo is given premium placement. All models of the wedges are available, in right or left hand. An added feature: each wedge is individually packaged in an attractive presentation box, with options for added-value items like Reid Lockhart caps or limited edition golf videos.

"Our corporate program was designed to give the golf professional a unique business opportunity," Koehler said. "He can offer these wedges for tournaments, and to his members for their own companies' premium and incentive uses. Every pro in the country has the opportunity to generate thousands of dollars in new sales, at margins that can be very exciting. If he sells logo golf balls, this in an add-on business opportunity."

All Reid Lockhart wedges feature the company's patented Dual Bounce Sole™ technology. According to Koehler, this unique configuration blends sole characteristics that make the wedges equally effective from various conditions -- from hardpan and tight lies to sand and rough. The 2001 wedges benefit from three years of actual course testing. Heads cast of a milder 303 stainless steel provide a softer feel of impact. The face profiles have been slightly reduced. A slimmer and longer hosel enables the club to glide more easily through deep rough and sand.

Another key improvement is the new FP-50™ shaft, a proprietary design exclusive to Reid Lockhart. The **FP-50™ 'Wedge Special'** combines a softer frequency with a very high flex point improving performance and feel over various swing speeds.

The Reid Lockhart wedges can be laser-engraved in quantities of twelve units or more. The company has already secured orders for country club tournaments and corporate premium uses, Koehler said.

Reid Lockhart is a Texas-based manufacturer of professional quality golf equipment and a subsidiary of Rivington Golf Management, Inc. With corporate